(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 094 572 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.04.2001 Bulletin 2001/17

(51) Int. Cl.[7]: **H01R 43/22**, H01R 13/422, H01R 13/436

(21) Application number: **00122302.3**

(22) Date of filing: **20.10.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **22.10.1999 JP 30129599**

(71) Applicant:
Sumitomo Wiring Systems, Ltd.
Yokkaichi-City, Mie, 510-8503 (JP)

(72) Inventor:
Kojima, Eiji,
Sumitomo Wiring Systems, Ltd.
Yokkaichi-city, Mie 510-8503 (JP)

(74) Representative:
Müller-Boré & Partner
Patentanwälte
Grafinger Strasse 2
81671 München (DE)

(54) A terminal fitting and a connector

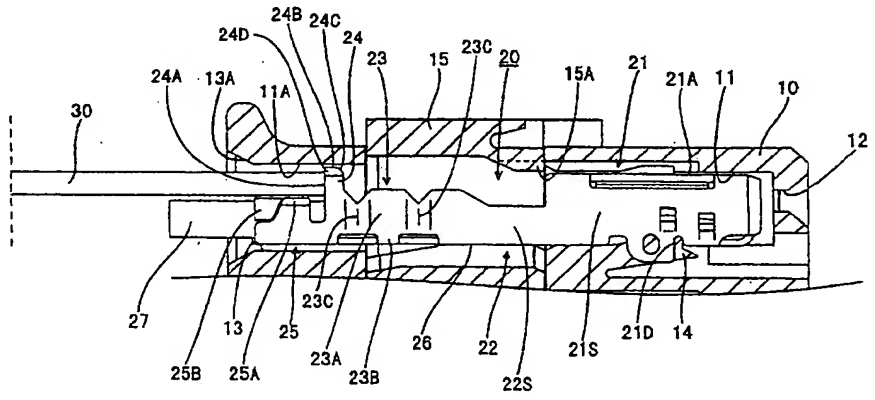
(57) [Object]

To avoid complicating the shape of and enlarging the size of a terminal fitting which is insertable into a connector housing using a pushing jig and is designed to have its loose movement in the connector housing restricted.

[Solution]

A terminal fitting 20 is formed with jig contact portions 24 with which a pushing jig 30 is to be brought into contact. The jig contact portion 24 are provided with a loose movement restricting function of restricting a loose movement of the terminal fitting 20 in a cavity 11 in a direction intersecting with an inserting direction of the terminal fitting 20 by coming into contact with a ceiling wall 11A of the cavity 11. Since the jig contact portions 24 have also the loose movement restricting function, it is not necessary to form a loose movement restricting portion separately from the jig contact portion 24. This enables an avoidance of a complicated shape and an enlarged size of the entire terminal fitting 20.

FIG. 4



EP 1 094 572 A1

Description

[0001] The present invention relates to a terminal fitting and to a connector comprising the same.

[0002] Known methods for connecting a wire with a terminal fitting by insulation displacement include a method for connecting a wire with an insulation-displacement terminal accommodated in a connector housing and a method for connecting a wire with an insulation-displacement terminal outside a connector housing and then inserting the terminal fitting connected with the wire into the connector housing. An example of the latter method is disclosed in Japanese Unexamined Patent Publication No. 7-272815.

[0003] In the case of the latter method, the terminal fitting connected with the wire is inserted into a cavity formed in the connector housing by gripping the wire or by being pushed by means of a pushing jig. If the terminal fitting is inserted by gripping the wire, the wire may be buckled or deformed due to an insertion resistance to hinder a smooth insertion of the terminal fitting or may be displaced in its position where the wire is in contact with the terminal fitting, thereby causing a contact failure. Accordingly, it is preferable to insert the terminal fitting by directly pushing it by means of the pushing jig. The terminal fitting to be inserted using the pushing jig is formed with a jig contact portion with which the pushing jig is brought into contact.

[0004] On the other hand, unlike the cavity in the connector housing which is formed to have substantially constant height and width over its entire length, the terminal fitting has an undefined shape whose width and height vary along the length since connecting portions with a mating terminal fitting and the wire have shapes and dimensions suitable for their functions. Thus, when the terminal fitting is inserted into the cavity, a large space is defined between a part of the terminal fitting and the cavity, with the result that the terminal fitting may loosely move in a direction intersecting with an inserting direction of the terminal fitting into the cavity. In order to prevent such a loose movement, some terminal fittings are formed with a loose movement restricting portion called stabilizer.

[0005] As described above, the terminal fitting secured to the wire outside the connector housing may be formed with both the jig contact portion with which the pushing jig is to be brought into contact and the loose movement restricting portion for restricting a loose movement of the terminal fitting in the cavity. However, if these two portions are formed, the terminal fitting may have a more complicated shape and a larger size.

[0006] In view of the above situation, an object of the present invention is to provide a terminal fitting and a corresponding connector which avoid complicating the shape of and enlarging the size of a terminal fitting which is inserted into a connector housing using a pushing jig and is in particular designed to restrict its loose movement in the connector housing.

[0007] This object is solved according to the invention by a terminal fitting according to claim 1 or 6 and by a connector according to claim 7. Preferred embodiments are subject of the dependent claims.

[0008] According to the invention, there is provided a terminal fitting to be connected with a wire outside a connector housing and to be inserted into a cavity formed in the connector housing by a pushing jig or other inserting means after being connected with the wire, comprising at least one jig contact portion with which the pushing jig is to be brought into contact, wherein the jig contact portion has a loose movement restricting function of restricting a loose movement of the terminal fitting in the cavity in a direction intersecting or being arranged at an angle different from 0° or 180° with an inserting direction of the terminal fitting by being able to come or coming into contact with an inner wall of the cavity.

[0009] Since the jig contact portion has also the loose movement restricting function, it is not necessary to form a loose movement restricting portion separately from the jig contact portion. This enables an avoidance of an complicated size and an enlarged size of the entire terminal fitting.

[0010] According to a preferred embodiment of the invention, the jig contact portion projects in a direction intersecting with the inserting direction of the terminal fitting, and an edge or an edge portion thereof extending along this projecting direction serves as a receiving portion for receiving the pushing jig and a projecting edge or projecting edge portion thereof serves as a contact portion to be brought into contact with the inner wall of the cavity.

[0011] Since the jig contact portion projects in the direction intersecting with the inserting direction of the terminal fitting into the cavity, it is allowed to have a simple shape.

[0012] Preferably, a projecting end portion of the jig contact portion is formed with a guiding portion extending in a direction oblique to the inserting direction of the terminal fitting into the cavity.

[0013] Even if the terminal fitting is loosely moved in the projecting direction of the jig contact portion at the entrance of the cavity while being inserted into the cavity, the orientation thereof is corrected by the guiding portion coming into contact with the entrance of the cavity, enabling a smooth insertion.

[0014] Most preferably, the jig contact portion projects or can project along an inner wall surface of the cavity in a direction intersecting with the inserting direction of the terminal fitting into the cavity, and a slanted escaping surface is formed on an outer surface of a projecting end portion of the jig contact portion.

[0015] Even if the jig contact portion is displaced in such a direction that its projecting end is inclined outwardly, the projecting end edge of the jig contact portion is not caught by the opening edge of the entrance of the

cavity since the slanted escaping surface is formed on the outer surface of the projecting end of the jig contact portion.

[0016] According to a further preferred embodiment, inner surfaces of upper end portions of the jig contact portion comprise slanted guide surfaces for guiding the wire to be connected with the terminal fitting.

[0017] According to the invention, there is further provided a terminal fitting to be connected with a wire outside a connector housing and to be inserted into a cavity formed in the connector housing by a pushing jig after being connected with the wire, comprising at least one jig contact portion with which the pushing jig is to be brought into contact, wherein the jig contact portion can project along an inner wall surface of the cavity in a direction intersecting with the inserting direction of the terminal fitting into the cavity, and a slanted escaping surface is formed on an outer surface of a projecting end portion of the jig contact portion.

[0018] According to the invention, there is still further provided a connector comprising a connector housing having at least one cavity into which at least one corresponding terminal fitting according to the invention or an embodiment thereof is to be at least partly inserted by means of a pushing jig or other inserting means.

[0019] According to a preferred embodiment of the invention, the terminal fitting comprises contact portions to be brought into contact with the inner wall of the cavity and a connecting portion to be connected with a mating terminal fitting, wherein a height of contact portions of the terminal fitting is adjusted in view of the clearance above and/or below the connecting portion, a dimension of the connecting portion in forward and backward directions, a distance between the connecting portion and the jig contact portion in forward and backward directions, and the shapes and elasticity limits of a portion of the terminal fitting extending between the jig contact portion and the connecting portion, insulation-displacement portions, the jig contact portion and/or a crimping portion, such that the loose movement amount lies within a range of elasticity of the terminal fitting.

[0020] Preferably, the connector housing comprises a terminal inserting opening having one or more slanted guide surfaces for guiding the insertion of the terminal fitting thereinto or therethrough.

[0021] These and other objects, features and advantages of the present invention will become apparent upon reading of the following detailed description of preferred embodiments and accompanying drawings in which:

FIG. 1 is a perspective view of a terminal fitting according to one embodiment of the present invention,

FIG. 2 is a side view of the terminal fitting separate from a connector housing shown in section,

FIG. 3 is a section showing an intermediate stage of insertion of the terminal fitting into the connector housing,

FIG. 4 is a section showing the terminal fitting properly inserted in the connector housing,

FIG. 5 is a section showing a state where the properly inserted terminal fitting is doubly locked by a retainer, and

FIG. 6 is a front view of the terminal fitting.

[0022] Hereinafter, one preferred embodiment of the invention is described with reference to FIGS. 1 to 6.

[0023] In this embodiment, front side corresponds to right side in FIGS. 2 to 5, vertical direction is based on FIGS. 2 to 6, and lateral direction is based on FIG. 6. It should be noted that inserting and withdrawing directions of a terminal fitting 20 into and from a cavity 11 mean the same as longitudinal or forward and backward directions.

[0024] First, a connector housing 10 into which the terminal fitting 20 according to this embodiment is to be inserted along an inserting direction ID is described. Inside the connector housing 10 is formed the at least one cavity 11 which penetrates the connector housing 10 substantially in forward and backward directions. A front end opening of the cavity 11 serves as a connection opening 12 through which a tab (not shown) of a mating terminal fitting is or can be entered, whereas a rear end opening thereof serves as a terminal insertion opening 13. A spacing between inner wall surfaces of the cavity 11 is substantially constant from the terminal insertion opening 13 to the back end. A locking portion 14 is formed on the bottom wall of the cavity 11 for locking the terminal fitting 20 properly inserted into the cavity 11. Further, a retainer 15 is so mounted in the connector housing 10 as to vertically cross the cavity 11, and is displaceable between a partial locking position where insertion and withdrawal of the terminal fitting 20 are permitted (see FIGS. 2 to 4) and a full locking position where the terminal fitting 20 is doubly locked (see FIG. 5).

[0025] Next, the terminal fitting 20 according to this embodiment is described.

[0026] The terminal fitting 20 is formed e.g. by bending a metal plate punched out in a specified shape, and is provided with a connecting portion 21, an extending portion 22, insulation-displacement portions 23, a jig contact portion 24, a crimping portion 25 which are connected one after another in this order at least via a bottom wall 26. The connecting portion 21 preferably includes the bottom wall 26, a pair of side walls 21S substantially vertically extending from the left and right edges of the bottom wall 26, a pair of ceiling walls 21A, 21B extending inwardly from the upper ends of the side walls 21S and preferably placed substantially one over the other and is in the form of a substantially rectangular tube having substantially open front and rear ends. In the connecting portion 21 is accommodated an elastic

contact piece 21C (FIG. 6) folded back or substantially upward from the front end of the bottom wall 26. A tab (not shown) is tightly held between the elastic contact piece 21C and the lower ceiling wall 21B to establish an electrically connected state. Further, a locking hole 21D is formed in the bottom wall 26 of the connecting portion 21, and the terminal fitting 20 is locked in the cavity 11 by the engagement of the locking portion 14 and the locking hole 21D. The extending portion 22 is comprised of a pair of side walls 22S substantially vertically extending from the left and right side edges of the bottom wall 26, and an end of a wire 27 is or can be accommodated between the side walls 22S. The crimping portion 25 is comprised of a pair of barrel portions 25A, 25B which substantially vertically extend from the left and right side edges of the bottom wall 26 and are or can be displaced in forward and backward directions. The barrel portions 25A, 25B are crimped into connection with the outer surface of the wire 27. Each insulation-displacement portion 23 is comprised of a pair of laterally spaced apart blade portions 23A extending between the front ends of the jig contact portion 24 to be described later and rear ends of the side walls 22S of the extending portion 22. The blade portions 23A are connected with the bottom wall 26 via connecting portions 23B preferably only in their substantially center positions with respect to forward and backward directions. Each blade portion 23A is bent inwardly or formed by inwardly bending the side walls 22S to have a V-shape when viewed from above before and behind the corresponding connecting portions 23B, and an apex of the V-shape functions as a cutting blade 23C. Two pairs of laterally spaced cutting blades 23C are provided one after the other. When the wire 27 is pushed between the cutting blades 23C from above, the cutting blades 23C cut a resin coating of the wire 27 to be electrically connected with a core of the wire 27.

[0027] Next, the jig contact portions 24 are described. As described later, the terminal fitting 20 is or can be secured to the end of the wire 27 outside the connector housing 10 and then inserted into the connector housing 10 using a pushing jig 30 or the like inserting or manipulating means, which may be manually operated and/or automatically drive. The jig contact portion 24 have a function of receiving a pushing force from behind given by the pushing jig 30. A pair of jig contact portions 24 in the form of a substantially flat plate substantially vertically extend from the left and right side edges of the bottom wall 26. An extending direction of the jig contact portion 24 is substantially normal to the inserting and withdrawing directions of the terminal fitting 20 into and from the cavity 11 and is along the inner side walls of the cavity 11. A spacing between the outer surfaces of the jig contact portion 24, the connecting portion 21, the extending portion 22, the insulation-displacement portions 23 and/or the crimping portion 25 is slightly narrower than the width of the cavity 11 by a specific (predetermined or predeterminable) clearance preferably provided in view of a tolerance. A dimension between the lower surface of the bottom wall 26 and the upper edge of the jig contact portion 24 is set shorter than the height of the cavity 11 near the insertion opening 13. This dimensional difference is set in consideration of not only a dimensional tolerance and an assembling tolerance, but also restriction on an upward loose movement of the rear end of the terminal fitting 20.

[0028] The rear end faces of the jig contact portion 24 extending in vertical direction (projecting direction) serve as receiving portions 24A with which the pushing jig 30 is to be brought into contact from behind. Since the receiving portions 24A are located above the crimping portion 25 already crimped, the pushing jig 30 does not interfere the crimping portion 25. Further, since the jig contact portion 24 are located behind the insulation-displacement portions 23, the pushing jig 30 does not interfere the insulation-displacement portions 23, either. The upper ends (projecting ends) of the jig contact portion 24 serve as contact portions 24B which face a ceiling wall 11A of the cavity 11 while being slightly spaced apart therefrom when the terminal fitting 20 is inserted into the cavity 11.

[0029] Front ends of upper end portions of the jig contact portion 24 are partly cut away to form guiding portions 24C. The guiding portions 24C are preferably arcuate in side view and extend in a direction substantially oblique to or at an angle different from 0° or 90° with respect to the inserting and withdrawing directions of the terminal fitting 20 into and from the cavity 11. Further, the outer surfaces of the upper end portions of the jig contact portion 24 are slanted when viewed in the inserting and withdrawing directions of the terminal fitting 20 into and from the cavity 11, thereby forming escaping surfaces 24D. Each escaping surface 24D is slanted in such a direction that a distance to the corresponding inner side wall surface of the cavity 11 increases toward the upper end. In other words, the slanting directions of the escaping surfaces 24D are set such that, if the jig contact portion 24 are deformed to lean outward or the entire terminal fitting 20 is inclined to the left or the right, one of the escaping surfaces 24D approaches a corresponding inner wall surface 11S of the cavity 11 and is held in a position where it extends substantially parallel to the inner wall surface 11S substantially without being in contact therewith. Further, the inner surfaces of the upper end portions of the jig contact portion 24 are formed into slanted guide surfaces 24E in order to avoid an interference with the wire 27 to be dropped into the insulation-displacement portions 23 and the crimping portion 25 from above.

[0030] Next, the action of this embodiment is described.

[0031] The terminal fitting 20 is accommodated in a connecting jig (not shown) outside the connector housing 10, and one end of the wire 27 is secured to the terminal fitting 20 using a pressing jig (not shown) and a

crimping jig (not shown). The terminal fitting 20 connected with the wire 27 is inserted into the cavity 11 of the connector housing 10 by the pushing jig 30. The pushing jig 30 is placed such that its lower surface substantially extends along the upper surface of the crimping portion 25 and its leading end is in contact with the receiving portions 24A of the jig contact portion 24 from behind. In this state, the terminal fitting 20 is pushed forward by the pushing jig 30. At this stage, the retainer 15 is held in the partial locking position in the connector housing 10. During the insertion of the terminal fitting 20, the locking portion 14 is pushed up by the bottom wall 26, thereby being elastically deformed (see FIG. 3). When the terminal fitting 20 reaches a proper insertion position, the locking portion 14 is restored preferably to substantially its original shape to engage the locking hole 21D, with the result that the terminal fitting 20 is partly locked (see FIG. 4). Thereafter, when the retainer 15 is pushed down to the full locking position, a locking portion 15A of the retainer 15 engages the rear ends of the ceiling walls 21A, 21B of the connecting portion 21. As a result, the terminal fitting 20 is doubly locked so as not to come out of the cavity 11.

[0032] With the terminal fitting 20 inserted, it is unavoidable to have a clearance between the outer surface of the terminal fitting 20 and the inner surface of the cavity 11 due to tolerances. Particularly, since the extending portion 22, the insulation-displacement portions 23 and the crimping portion 25 having shorter heights than the connecting portion 21 at the front end are present at the rear end of the terminal fitting 20, the terminal fitting 20 may make a loose pivotal movement substantially about the connecting portion 21 in such a direction that the rear side thereof is moved upward (direction intersecting with the inserting direction of the terminal fitting 20) when an upward force acts on the wire 27. At this time, even if the clearance between the connecting portion 21 and the cavity 11 is small, a degree of pivotal displacement of the rear end of the terminal fitting 20 about the connecting portion 21 is large.

[0033] However, in this embodiment, the upper ends of the jig contact portion 24 serve as the contact portions 24B facing the ceiling wall 11A of the cavity 11 while being only slightly spaced therefrom. Accordingly, even if the rear end of the terminal fitting 20 tries to move upward, such an upward displacement is restricted by the contact of the contact portions 24B of the jig contact portion 24 with the ceiling wall 11A of the cavity 11 from below. As a result, a loose movement of the terminal fitting 20 can be prevented.

[0034] One mode of loose movement restriction is to set an upward/downward displacement amount of the rear end of the terminal fitting 20 substantially smaller than an upward/downward displaceable range resulting from the clearance between the connecting portion 21 and the inner surface of the cavity 11. In this case, the height of the contact portions 24B is at maximum so that there is only a minimum difference between the dimension from the bottom wall 26 to the contact portions 24B and the height of the cavity 11. This minimum difference is required to provide a clearance for tolerance. With the maximum height of the contact portions 24B, the upward/downward displacement amount of the terminal fitting 20 is at minimum. The height of the contact portions 24B is reduced in the case that a loose movement permitting range is enlarged. At this time, the height of the contact portions 24B is adjusted in view of the clearance above and/or below the connecting portion 21, the dimension of the connecting portion 21 in forward and backward directions, and a distance between the connecting portion 21 and the jig contact portion 24 in forward and backward directions, such that the loose movement amount is substantially smaller than the upward/downward displaceable range due to the clearance above and/or below the connecting portion 21.

[0035] Another mode of loose movement restriction is to permit such a displacement of the terminal fitting 20 beyond a maximum displaceable range resulting from the clearance above the connecting portion 21 that any of the extending portion 22, the insulation-displacement portions 23 and the crimping portion 25 undergoes an elastic deformation, but to restrict such a displacement that any of the extending portion 22, the insulation-displacement portions 23 and the crimping portion 25 undergoes a plastic deformation. In this case, the height of the contact portions 24B is adjusted in view of the clearance above and/or below the connecting portion 21, the dimension of the connecting portion 21 in forward and backward directions, the distance between the connecting portion 21 and the jig contact portion 24 in forward and backward directions, and the shapes and elasticity limits of the extending portion 22, the insulation-displacement portions 23, the jig contact portion 24 and the crimping portion 25, such that the loose movement amount lies within a range of elasticity of the terminal fitting 20.

[0036] In the case that the terminal fitting 20 is so inclined as to displace its rear end upward before the jig contact portion 24 enter the cavity 11 in an inserting operation of the terminal fitting 20, the upper ends of the jig contact portion 24 interfere the upper end of the insertion opening 13. However, since the upper end of the insertion opening 13 is formed into a slanted guide surface 13A which obliquely extends upward toward the outside and the guiding portions 24C are formed at the front ends of the upper end portions of the jig contact portion 24, the orientation of the terminal fitting 20 is corrected by the contact of the guiding portions 24C and the guide surface 13A. Therefore, the terminal fitting 20 can be inserted without any hindrance.

[0037] Further, in the case that the terminal fitting 20 is inclined to the left or the right or the jig contact portion 24 are deformed outwardly to widen a spacing therebetween, the upper end portions of the jig contact portion 24 may interfere the side edges of the insertion opening 13. However, since the escaping surfaces 24D

are formed on the outer surfaces of the upper end portions of the jig contact portion 24, an interference of the jig contact portion 24 with the edge of the insertion opening 13 can be avoided, resulting in a smooth insertion of the terminal fitting 20.

[0038] As described above, since the jig contact portions 24 formed to enable the insertion of the terminal fitting 20 by the pushing jig 30 have also a function of restricting the loose movement of the terminal fitting 20 in the cavity 11 in this embodiment, it is not necessary to form a loose movement restricting portion separately from the jig contact portion 24. This enables an avoidance of a complicated shape and an enlarged size of the entire terminal fitting 20.

[0039] Further, if an attempt is made to reduce the size of the terminal fitting 20 while forming a loose movement restricting portion separately from the jig contact portion 24, the jig contact portion 24 and the loose movement restricting portion are obliged to be made small, resulting in reduced strength. However, since it is sufficient to form only the jig contact portion 24 having both functions of contacting the jig and restricting a loose movement of the terminal fitting 20 inside the cavity 11 or the connector housing 10 in this embodiment, the terminal fitting 20 is allowed to have a sufficient strength by forming the jig contact portion 24 in maximally large size.

[0040] Since the jig contact portion 24 project in the direction intersecting with the inserting direction of the terminal fitting 20 into the cavity 11, the shape thereof can be simple.

[0041] The present invention is not limited to the above embodiment. For example, following embodiments are also embraced by the technical scope of the invention as defined in the claims. Besides these embodiments, various changes can be made without departing from the scope and spirit of the invention as defined in the claims.

(1) Although the present invention is applied to the female terminal fitting in the foregoing embodiment, it is also applicable to male terminal fittings.
(2) Although the wire is secured to the terminal fitting by insulation displacement and crimping in the foregoing embodiment, the present invention is also applicable to terminal fittings to which wires are secured only by insulation displacement or only by crimping.

LIST OF REFERENCE NUMERALS

[0042]

10	connector housing
11	cavity
20	terminal fitting
24	jig contact portion
24A	receiving portion
24B	contact portion
24C	guiding portion
24D	escaping surface
27	wire
30	pushing jig

Claims

1. A terminal fitting (20) to be connected with a wire (27) outside a connector housing (10) and to be inserted into a cavity (11) formed in the connector housing (10) by a pushing jig (30) after being connected with the wire (27), comprising at least one jig contact portion (24) with which the pushing jig (30) is to be brought into contact, wherein the jig contact portion (24) has a loose movement restricting function of restricting a loose movement of the terminal fitting (20) in the cavity (11) in a direction intersecting with an inserting direction (ID) of the terminal fitting (20) by being able to come into contact with an inner wall (11S) of the cavity (11).

2. A terminal fitting (20) according to claim 1, wherein the jig contact portion (24) projects in a direction intersecting with the inserting direction (ID) of the terminal fitting (20), and an edge or an edge portion (24A) thereof extending along this projecting direction serves as a receiving portion (24A) for receiving the pushing jig (30) and a projecting edge or edge portion (24B) thereof serves as a contact portion (24B) to be brought into contact with the inner wall (11S) of the cavity (11).

3. A terminal fitting (20) according to claim 2, wherein a projecting end portion (24C) of the jig contact portion (24) is formed with a guiding portion (24C) extending in a direction oblique to the inserting direction (ID) of the terminal fitting (20) into the cavity (11).

4. A terminal fitting (20) according to one or more of the preceding claims, wherein the jig contact portion (24) projects along an inner wall surface (11S) of the cavity (11) in a direction intersecting with the inserting direction (ID) of the terminal fitting (20) into the cavity (11), and a slanted escaping surface (24D) is formed on an outer surface of a projecting end portion of the jig contact portion (24).

5. A terminal fitting (20) according to one or more of the preceding claims, wherein inner surfaces of upper end portions of the jig contact portion (24) comprise slanted guide surfaces (24E) for guiding the wire (27) to be connected with the terminal fitting.

6. A terminal fitting (20) to be connected with a wire (27) outside a connector housing (10) and to be

inserted into a cavity (11) formed in the connector housing (10) by a pushing jig (30) after being connected with the wire (27), comprising at least one jig contact portion (24) with which the pushing jig (30) is to be brought into contact, wherein the jig contact portion (24) can project along an inner wall surface (11S) of the cavity (11) in a direction intersecting with the inserting direction (ID) of the terminal fitting (20) into the cavity (11), and a slanted escaping surface (24D) is formed on an outer surface of a projecting end portion of the jig contact portion (24).

7. A connector comprising a connector housing (10) having at least one cavity (11) into which at least one corresponding terminal fitting (20) according to one or more of the preceding claims is to be at least partly inserted by means of a pushing jig (30).

8. A connector according to claim 7, wherein the terminal fitting (20) comprises contact portions (24B) to be brought into contact with the inner wall (11S) of the cavity (11) and a connecting portion (21) to be connected with a mating terminal fitting, wherein a height of contact portions (24B) of the terminal fitting (20) is adjusted in view of the clearance above and/or below the connecting portion (21), a dimension of the connecting portion (21) in forward and backward directions, a distance between the connecting portion (21) and the jig contact portion (24) in forward and backward directions, and the shapes and elasticity limits of a portion (22) of the terminal fitting (20) extending between the jig contact portion (24) and the connecting portion (21), insulation-displacement portions (23), the jig contact portion (24) and/or a crimping portion (25), such that the loose movement amount lies within a range of elasticity of the terminal fitting (20).

9. A connector according to claim 7 or 8, wherein the connector housing (11) comprises a terminal inserting opening (13) having one or more slanted guide surfaces (13A) for guiding the insertion of the terminal fitting (20) thereinto.

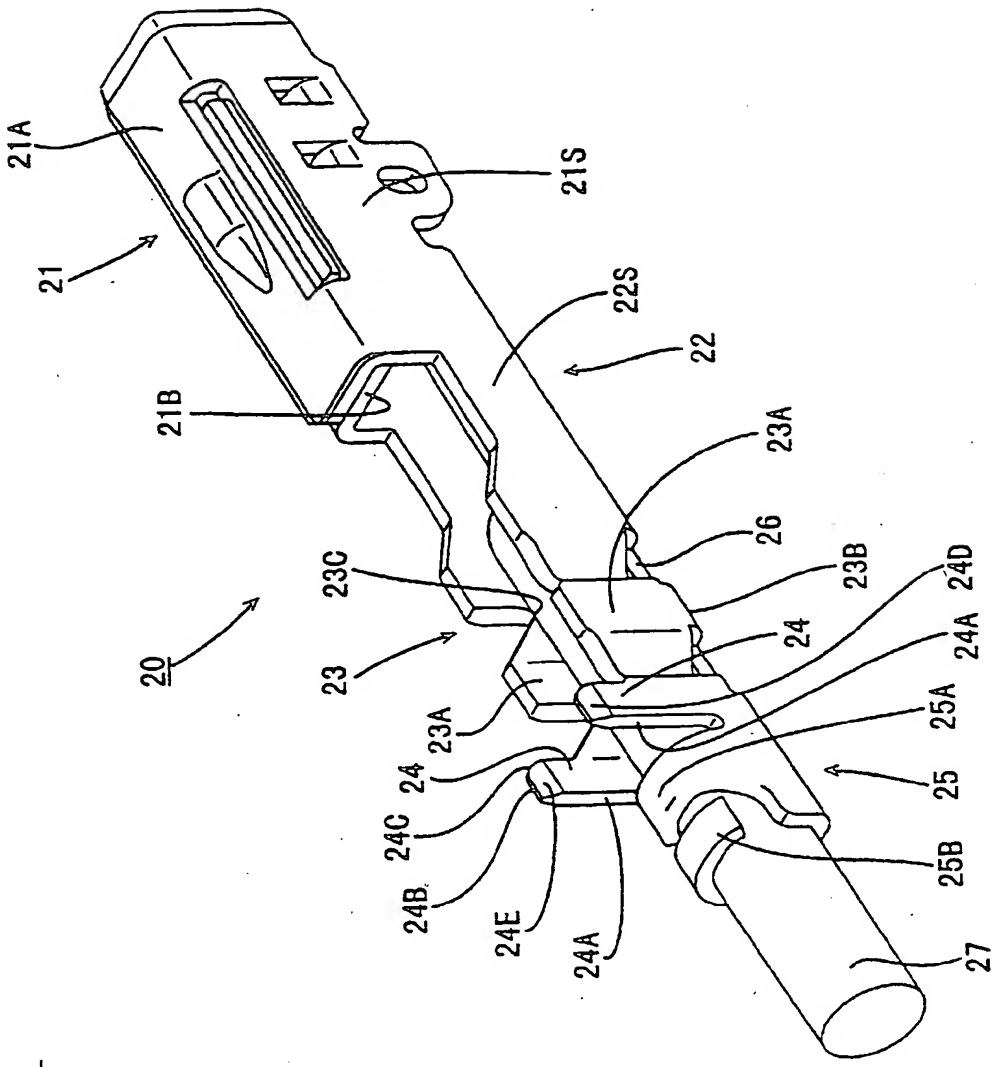

21A
21
21S
22S
22
21B
23A
26
23B
24D
23C
24
24A
20
23
23A
25A
24
25
24C
25B
24B
24E
24A
27

FIG. 1

FIG. 2

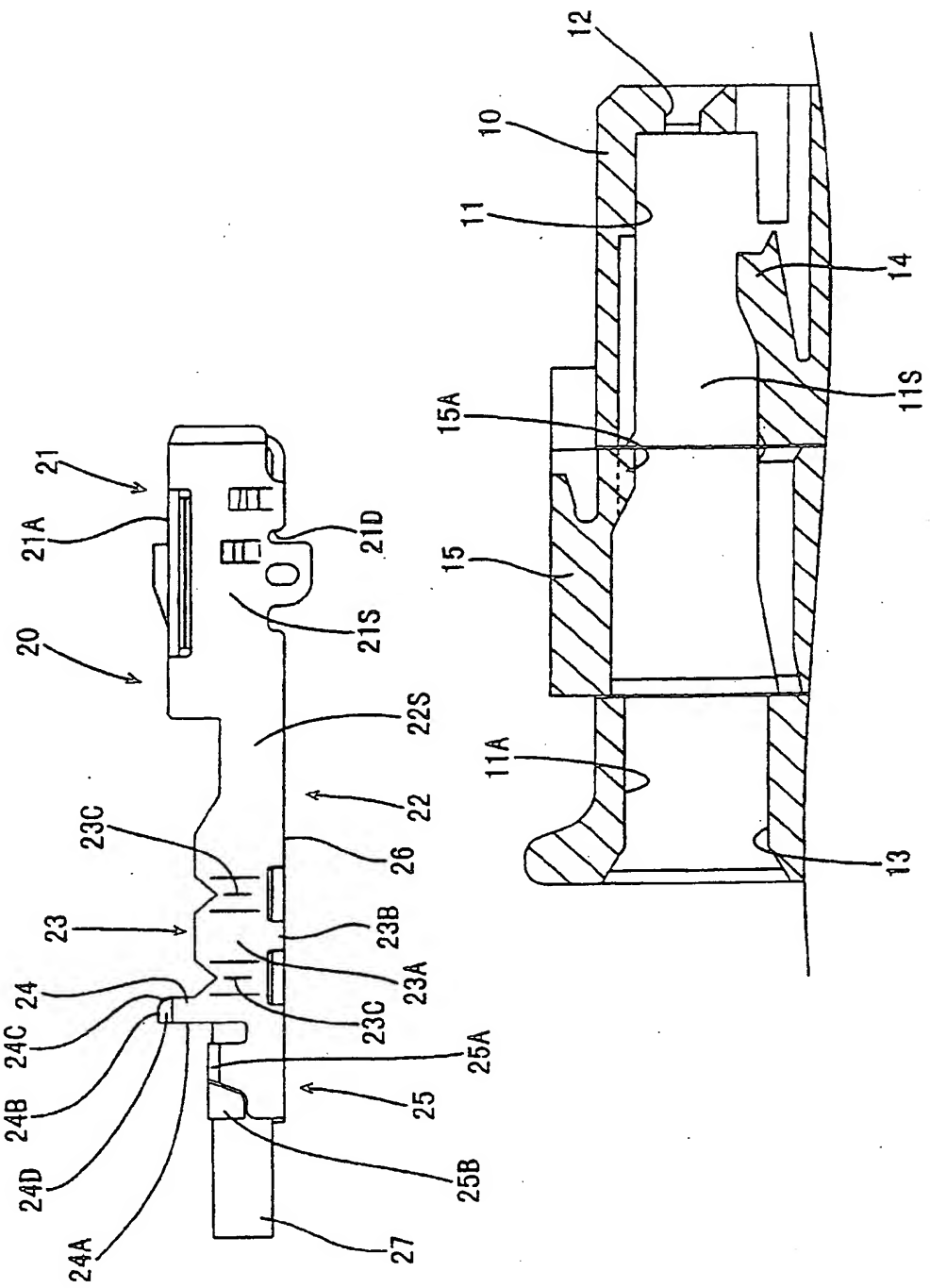

12
10
11
14
11S
15A
15
11A
13
21
21A
21D
21S
20
22S
22
23C
26
23
23B
23A
24
24C
24B
24D
24A
25A
25
25B
27

FIG. 3

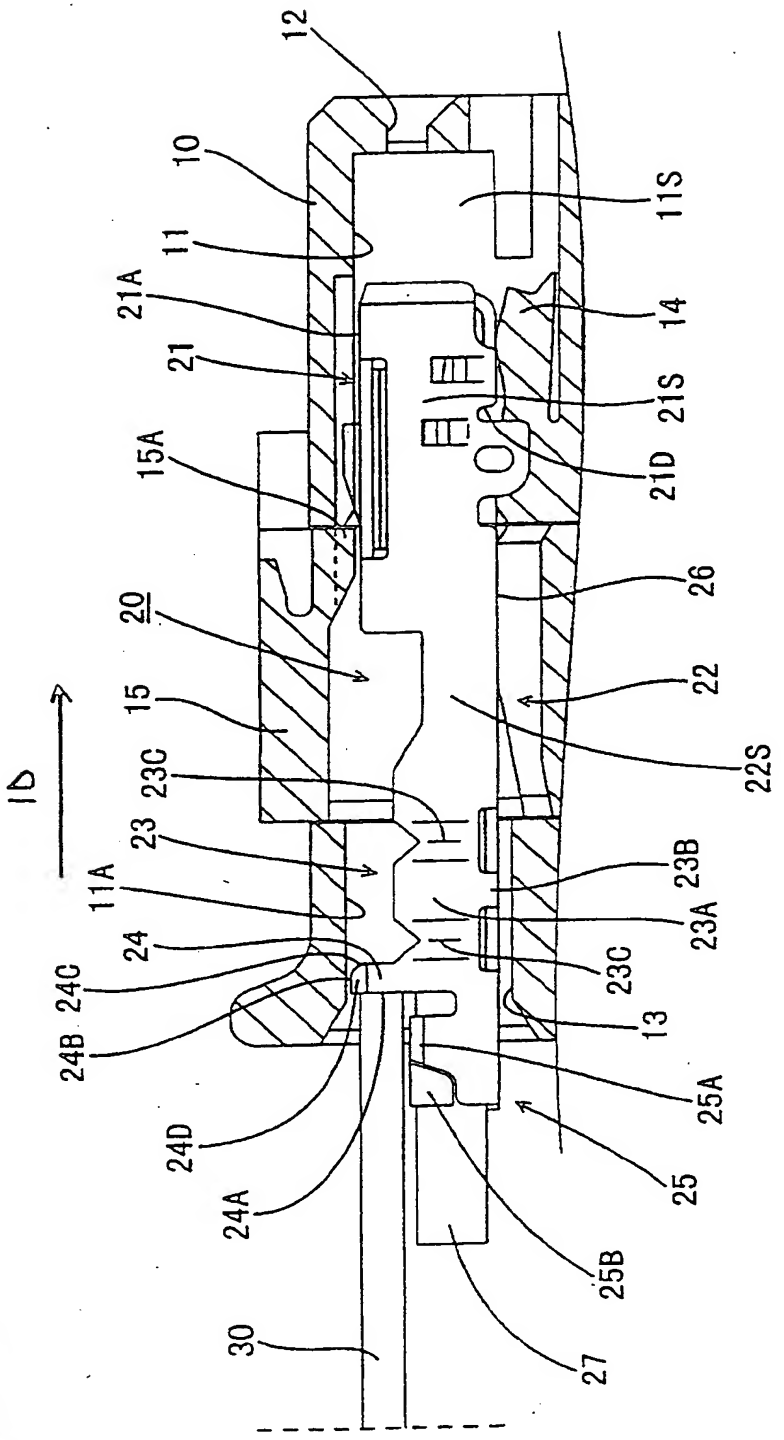

12
10
11S
11
21A
14
21
21S
21D
15A
26
20
22
15
22S
23C
23
23B
11A
23A
24
23C
24C
13
24B
25A
24D
25
24A
25B
30
27
ID

FIG. 4

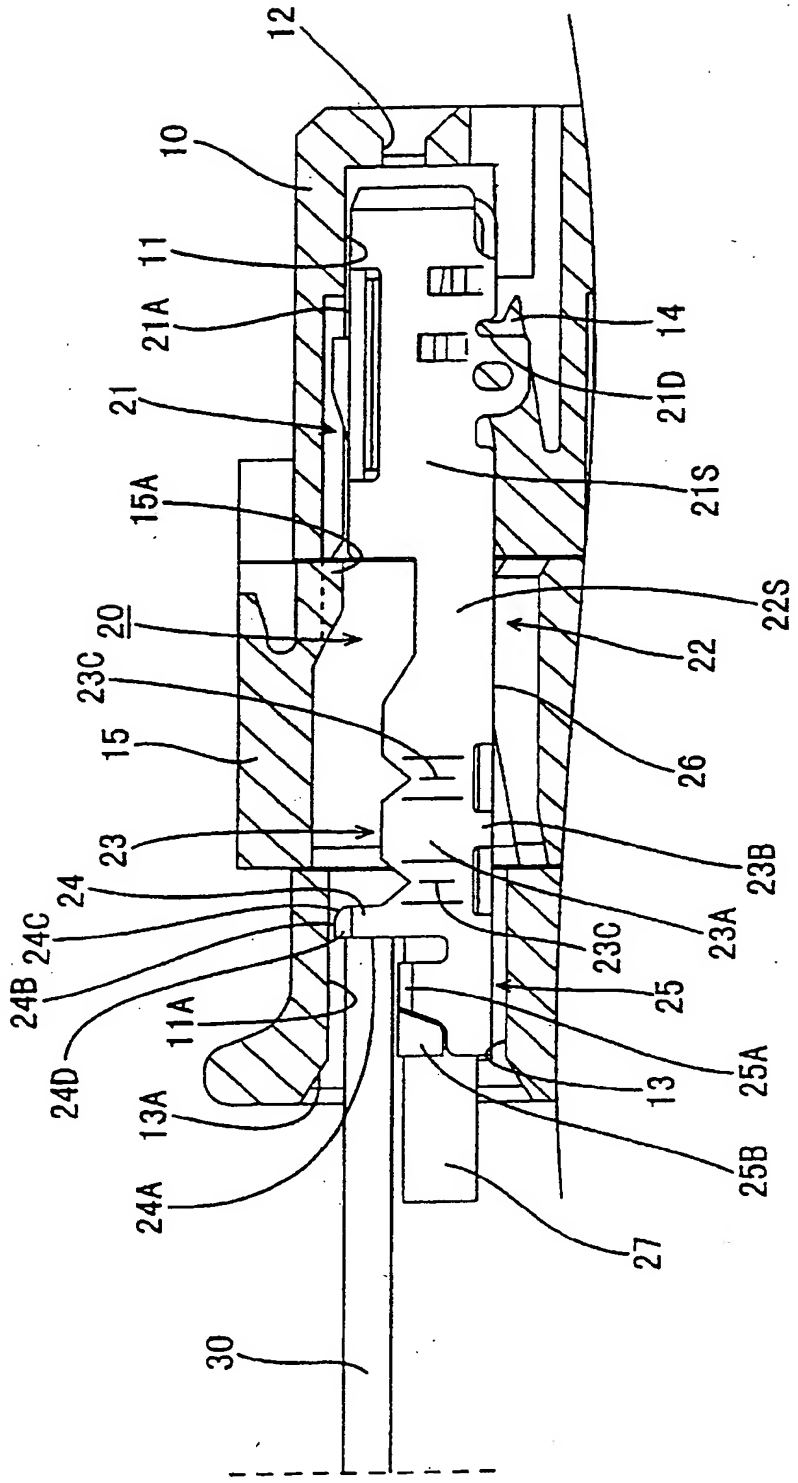

12
10
11
21A
21
15A
20
23C
15
23
24
24C
24B
24D
11A
13A
24A
30
14
21D
21S
22S
22
26
23B
23A
23C
25
25A
13
25B
27

FIG. 5

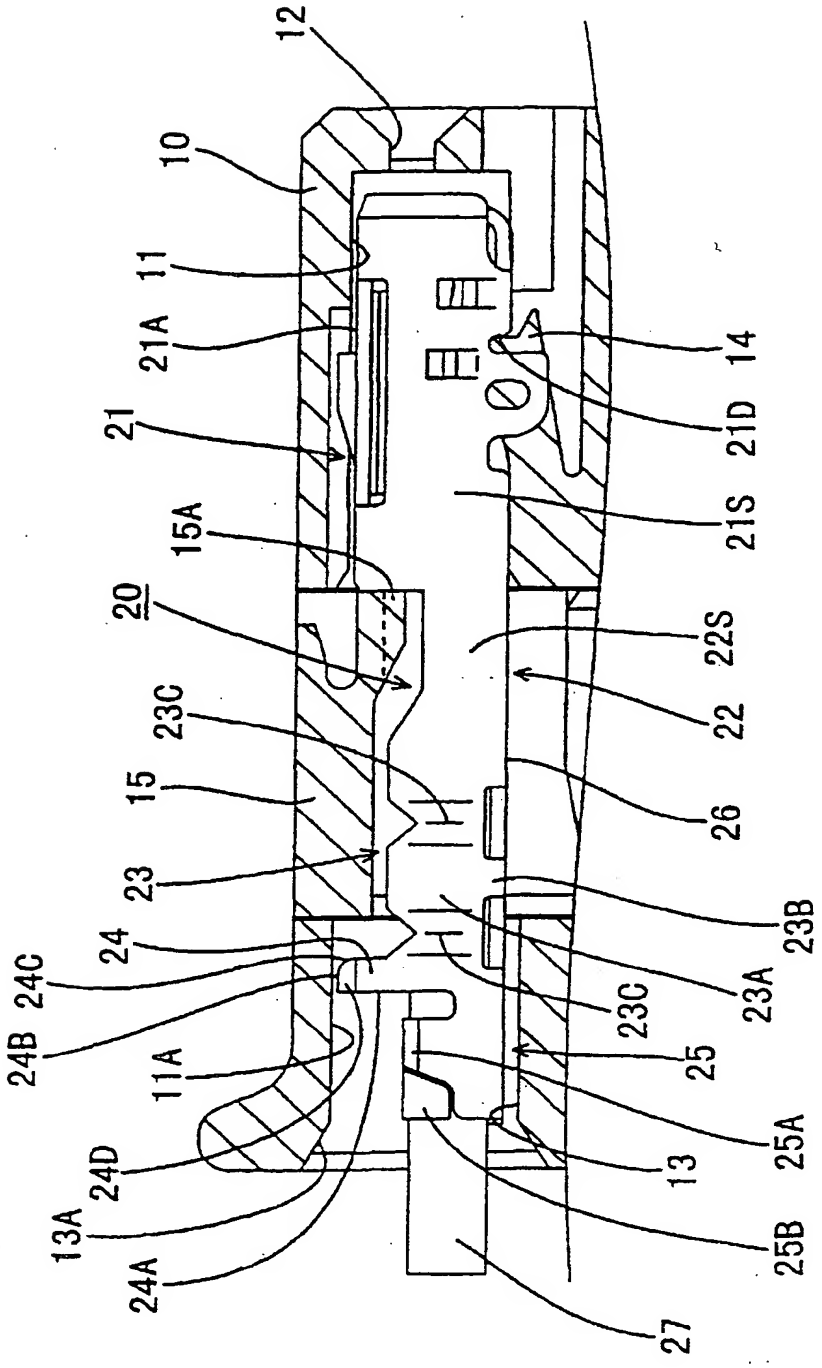
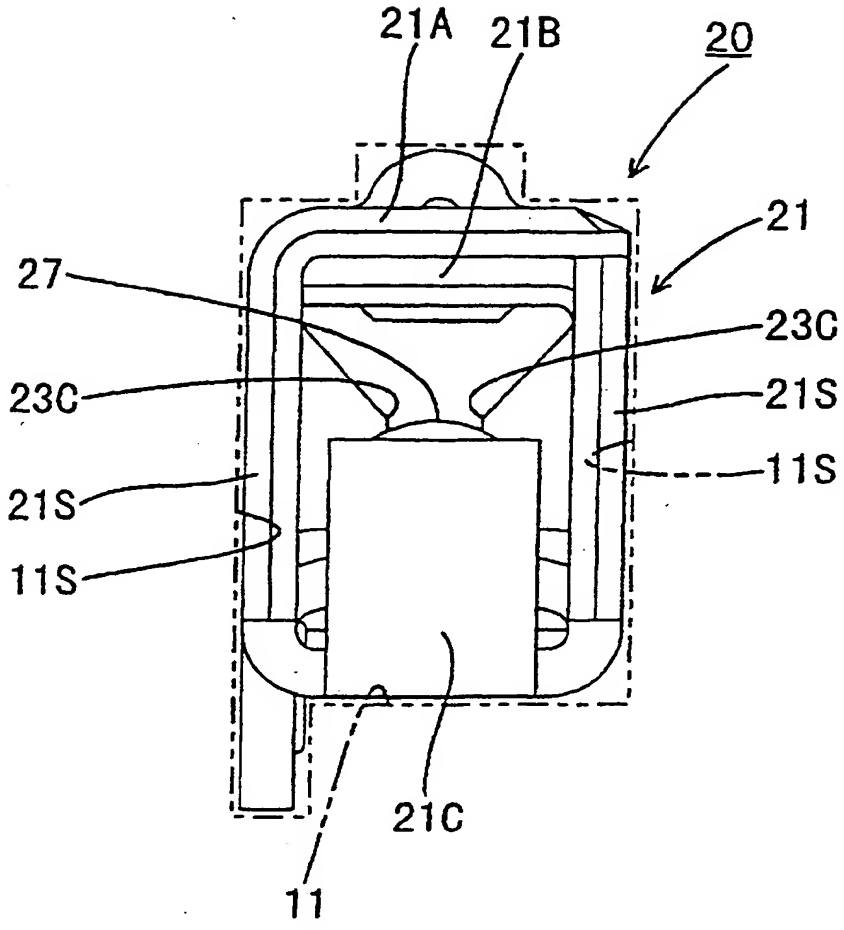

12
10
11
21A
21
15A
20
23C
15
23
24
24C
24B
11A
24D
13A
24A
14
21D
21S
22S
22
26
23B
23A
23C
25
25A
13
25B
27

FIG. 6



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 2302

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 920 082 A (SUMITOMO) 2 June 1999 (1999-06-02) * column 4, line 16 - line 26; figures 3-5 *	1-3,6,7, 9	H01R43/22 H01R13/422 H01R13/436
A	EP 0 622 867 A (SUMITOMO) 2 November 1994 (1994-11-02) * column 3, line 11 - line 35; figures 1,2 *	1,2,6,7, 9	
A	US 4 380 118 A (D.E.DRIVER ET AL) 19 April 1983 (1983-04-19) * column 2, line 35 - line 53; figures 2-4 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	9 February 2001	Alexatos, G

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 12 2302

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 920082 A	02-06-1999	JP 11219744 A	10-08-1999
		CN 1218311 A	02-06-1999
		US 6146215 A	14-11-2000
EP 622867 A	02-11-1994	DE 69411322 D	06-08-1998
		DE 69411322 T	21-01-1999
		US 5458426 A	17-10-1995
US 4380118 A	19-04-1983	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82